

PENNSYLVANIA RAILROAD, CONEMAUGH RIVER VIADUCT

(Stone Bridge)

Pennsylvania Historic Railroad Bridges Recording Project

Spanning Conemaugh River, north of Stonycreek River

Johnstown

Cambria County

Pennsylvania

HAER No. PA-517

HAER
PA
11-JOTO,
141-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

1849 C Street, NW

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Jet Lowe, photographer, spring 1999.

- PA-517-1 VIEW LOOKING DUE NORTH, NOTE THAT SOUTH FACE IS A
CONCRETE ADDITION DATING TO 1929.

- PA-517-2 VIEW OF MAIN CHANNEL SPANS, LOOKING DUE NORTH, WITH TRAIN
ON BRIDGE.

- PA-517-3 PERSPECTIVE VIEW OF SOUTH (CONCRETE) FACE, LOOKING EAST.

- PA-517-4 VIEW LOOKING DUE SOUTH, SHOWING ORIGINAL STONE OF NORTH
FACE, WITH CONCRETE REINFORCEMENT OF WESTERNMOST TWO
SPANS.

- PA-517-5 INTERIOR VIEW OF ARCHES, LOOKING SW.

HISTORIC AMERICAN ENGINEERING RECORD
PENNSYLVANIA RAILROAD, CONEMAUGH RIVER VIADUCT
(Stone Bridge)

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HAER No. PA-517

Location: Spanning Conemaugh River, north of Stonycreek River, Johnstown, Cambria County, Pennsylvania.

USGS Quadrangle: Johnstown, Pennsylvania (7.5-minute series).

UTM Coordinates: 17/676245/4466520

Dates of Construction: 1887-88.

Basis for Dating: Construction contracts.

Dates of Alteration: 1929, 1952.

Designer: William H. Brown (Chief Engineer, Pennsylvania Railroad).

Builders: Alexander G. Sparks and Shipley W. Evans (Philadelphia).

Present Owner: Norfolk Southern Railroad.

Present Use: Railroad bridge.

Structure Type: Stone arch.

Significance: This structure is the first large stone arch bridge among many that defined Chief Engineer William H. Brown's reputation as the Pennsylvania Railroad's "stone man." The site is also significant as the location of a predecessor structure, the railroad's first all-iron truss bridge. The so-called "Stone Bridge" played a prominent and tragic role in the Johnstown Flood of 1889.

Historian: Justin M. Spivey, April 2001.

Project Information: The Historic American Engineering Record (HAER) conducted the Pennsylvania Historic Railroad Bridges Recording Project during 1999 and 2000, under the direction of Eric N. DeLony, Chief. The project was supported by the Consolidated Rail Corporation (Conrail) and a grant from the Pennsylvania Historical and

Museum Commission (PHMC). Justin M. Spivey, HAER engineer, researched and wrote the final reports. Preston M. Thayer, historian, Fredericksburg, Virginia, conducted preliminary research under contract. Jet Lowe, HAER photographer, and Joseph E. B. Elliott, contract photographer, Sellersville, Pennsylvania, produced large-format photographs.

Description and History

Johnstown lies along the original main line of the Pennsylvania Railroad (PRR), constructed from Harrisburg to Pittsburgh in 1847-52. The Conemaugh River valley lies on the western slope of the Allegheny Mountains, offering the same relatively low grades as the Juniata River valley on the eastern side. In his description of the PRR's construction, railroad historian James E. Vance, Jr., pointed out that Johnstown lies at nearly the same elevation as Altoona, where Chief Engineer J. Edgar Thomson began his "direct assault on the Allegheny Front."¹ Having conquered the summit at Gallitzin, Thomson brought the railroad to Johnstown with the most difficult part of the task behind him. Having scraped by with impermanent wooden structures up to this point, the PRR constructed its first all-iron bridge at Johnstown in 1850. This structure, on the same site as the present structure, consisted of five 75'-0" arch-reinforced Pratt truss spans over the Conemaugh River. Fifteen years later, the spans were replaced with heavier Pratt trusses (*sans* arches).² This structure sufficed until the PRR began another round of main-line improvements in 1886, under the direction of Chief Engineer William H. Brown.

In many ways, construction of a stone bridge at Johnstown was linked to another stone bridge over Conestoga Creek at Lancaster.³ The two structures were often mentioned together in correspondence among PRR officials because they figured in plans for an eventual four-track main line across Pennsylvania. Both replaced iron truss bridges and were constructed in 1887 and 1888. In both cases, the old spans were shifted onto a temporary wooden trestle so that a new structure could be erected on the old alignment.⁴ According to one PRR history by Charles S. Roberts, Chief Engineer Brown had originally planned to replace the Johnstown bridge in iron. Only upon the suggestion of Pittsburgh Division Superintendent Robert Pitcairn did Brown—who later became known as the PRR's "stone man" because of his preference for the material—decide upon a stone bridge.⁵ This exchange may have influenced Brown's choice of stone for the Conestoga viaduct as well. Although the PRR solicited separate bids for the two structures, one unsuccessful bidder, Drake & Stratton Co. of Philadelphia, offered Brown a reduced price if allowed to construct both.⁶ Brown refused, however, and from there the two structures' paths diverged.

While compromises between durability and cost determined that the Conestoga viaduct would have only two tracks, the Johnstown bridge was constructed with four. On 22 March 1887, Brown approved a skewed stone arch structure, 50'-0" wide at the coping, with six 58'-0" segmental arch spans on 6'-0" piers. The "false skew" of 55 degrees is created by offsetting twelve 4'-0"-wide arch ribs in a stair-step pattern. Wing-walls, about 30'-0" long, protect the

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abutments.⁷ Before awarding the construction contract, Brown added a seventh 40'-0" span at the east end, with a 9'-6" pier between it and the last 58'-0" span, for a total length of 427'-6". All arches have the same rise of 14'-6"; the wider pier is necessary to resist the unbalanced thrust of the longer span. Philadelphia-based contractors Alexander G. Sparks and Shipley W. Evans signed a contract on 14 April 1887, agreeing to have two tracks on the south (upstream) side in service within eight months, and the entire bridge complete by 1 April of the following year. The contract further specified facing of "mountain sandstone," presumably the same Cambria County material used in the Conestoga viaduct, with backing of "any approved quality of stone." Sparks and Evans were not paid until 8 October 1888, suggesting that they might not have finished on time.⁸ Because it was the PRR's first large stone arch bridge west of the Susquehanna, the structure soon became known as the "Stone Bridge."⁹

The Stone Bridge's heavy construction caused it to play an insidious role in the Johnstown Flood of 31 May 1889. Unlike less substantial truss bridges, the PRR bridge did not yield to the debris-filled waters. Flood-borne material lodged against the bridge and caught fire before rescuers could save the victims trapped within.¹⁰ Correspondence in PRR records documents an interesting series of incidents caused by the accusation that the Stone Bridge had compounded the death toll. On 5 January 1890, Brown's faithful hand Pitcairn notified him that Pittsburgh explosives retailer Arthur Kirk had offered to blast away debris from the bridge. (Kirk was trying to dispose of 4 tons of state-owned dynamite earmarked for flood clean-up.) Pitcairn feared that the "statement that the stone bridge increased the loss of life and property will be raised again" if PRR did not clear the debris.¹¹ Once Kirk performed the work, however, his generosity was not rewarded. PRR Assistant Chief Engineer Joseph T. Richards accused Kirk of damaging the nosing of one pier and causing a large crack to appear with his blasting. Kirk was exonerated when a masonry foreman named Houston confirmed that the crack had existed before.¹² Nonetheless, the railroad had to repair portions of the arch rings, pier, and abutment because of flood damage.

The Stone Bridge has not fared well over the years because of the Conemaugh River's penchant for destructive flooding. Railroad records indicate major repairs in 1929, which may be the date when the upstream (south) face was reinforced with concrete and the westernmost two stone arches were replaced with concrete girder spans. Architectural detail in the addition — recessed panels emphasizing the arch form — seems consistent with serious flooding of the Conemaugh River in 1924.¹³ Original stonework is well-preserved in the remaining arches on the downstream side. The bridge remains in active service, carrying freight and Amtrak passenger trains.

Notes

1. James E. Vance, Jr., *The North American Railroad: Its Origin, Evolution, and Geography* (Baltimore: Johns Hopkins Univ. Press, 1995), 91.
2. Charles S. Roberts, *Triumph I: Altoona to Pitcairn, 1846-1996* (Baltimore: Barnard, Roberts & Co., 1996), 238.

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3. See U.S. Department of the Interior, HAER No. PA-517, "Pennsylvania Railroad, Conestoga Creek Viaduct," 2000, Prints and Photographs Division, Library of Congress, Washington, D.C.
4. After the new bridge opened to traffic, the old iron spans were re-used in the Juniata River bridge on the PRR's Tyrone Branch; see Roberts, *Triumph I*, 240.
5. Roberts, *Triumph I*, 239.
6. Drake & Stratton, to William H. Brown, 13 Apr. 1887, in file: Bridges - Philadelphia Division 1883-1903, Box 1454, Chief Engineer, Engineering Department, Pennsylvania Railroad Records, Acc. 1807, Hagley Museum and Library, Greenville, Del. [hereinafter cited as PRR Records].
7. Pennsylvania Railroad, "No. 3002 Ribbed Arch over Conemaugh River, West of Johnstown, Pittsburgh Div." (22 Mar 1887), milepost 275.34, region/division/branch 212102, aperture card files, Consolidated Rail Corp., Philadelphia, Pa. [transferred to Norfolk Southern Railway Co., Atlanta, Ga.].
8. Agreement No. 902, "Sparks and Evans, with the P. R. R. Co. for Johnstown Stone Arch Bridge" (14 Apr. 1887), in Box 746, Construction Contracts, Engineering Department, PRR Records.
9. William H. Sbank, ed., *Historic Bridges of Pennsylvania*, 4th ed. (York, Pa.: American Canal & Transportation Center, 1997), 50.
10. Richard J. Cook, *The Beauty of Railroad Bridges — Then and Now* (San Marino, Calif.: Golden West Books, 1987), 39, and Edwin P. Alexander, *On the Main Line: the Pennsylvania Railroad in the 19th Century* (New York: Clarkson N. Potter, Inc., 1971), 136. See also Karl Berger, ed., *Johnstown — The Story of a Unique Valley* (Johnstown, Pa.: Johnstown Flood Museum, 1984), 432, cited in Leslie Conrad, Curator, Cambria County Historical Society, letter to author, 30 Dec. 1999.
11. Robert Pitcairn, to William H. Brown, 5 Jan. 1890, in Folder 330.3, "Johnstown Flood - Rebuilding 1889-1891," Box 1452, Chief Engineer, Engineering Department, PRR Records.
12. Arthur Kirk, to William H. Brown, 6 Feb. and 14 Feb. 1890.
13. Correspondence files, milepost 275.34, region/division/branch 212102, Consolidated Rail Corp., Philadelphia, Pa. [transferred to Norfolk Southern Railway Co., Atlanta, Ga.]. On the 1924 flood, see "Johnstown Flooding and the U.S. Army Corps of Engineers," web site accessed 20 Mar. 2001 at <http://www.lrp.usace.army.mil/pm/b-john.htm>.

Acknowledgment

The author is grateful to Leslie Conrad, Curator of the Cambria County Historical Society, for responding to a preliminary survey form.

Additional Source

1. Interstate Commerce Commission, Bureau of Valuation, Engineering Field Notes, Pennsylvania Railroad (Aug. 1919), Box 6082, Record Group 134, National Archives, College Park, Md.